

AMENDMENTS TO THE SPECIFICATION:

Please replace the Abstract of the Disclosure with the following rewritten Abstract which appears on a separate sheet.

Page 1, before line 3, insert the following heading:

--BACKGROUND OF THE INVENTION--

Page 1, replace the paragraph beginning on line 11 with the following amended paragraph:

--A method for making a selective emitter in a p-type crystalline Si substrate, with which a diffusion material in the form of a doping paste, such as phosphorus paste, is applied to the substrate by screen printing is described in J. Horzel, J. Szlufeik, J. Nijs and R. Mertens, "A simple processing sequence for selective emitters", 26<sup>th</sup> PVSC, Sept. 30 - Oct. 3; Anaheim, CA; 1997 IEEE pp 139-142. The substrate is then dried on a conveyor belt and placed in a diffusion furnace. During the diffusion step the doping materials diffuse into the substrate ~~whilst~~ while diffusion material moves to the regions outside the imprint of doping material via the gas atmosphere in the furnace. Relatively deep diffusion zones having a phosphorus concentration varying from  $10^{20}$  at the surface of the substrate to  $10^{17}$  at a dept of 0.5  $\mu\text{m}$  below the substrate surface are formed below the imprinted dope material. Shallow diffusion zones having a low phosphorus concentration, varying from  $10^{19}$  at the substrate

surface to  $10^{18}$  at a depth of 0.2  $\mu\text{m}$ , are formed outside the region of the imprint.--

Page 1, replace the paragraph beginning on line 24 and bridging pages 2 and 3 with the following amended paragraph:

--The disadvantage of the known method, in particular in the case of the production of solar cells in which the highly doped regions are arranged in a pattern of a series of parallel tracks or fingers, is that the diffusion between the tracks having a high concentration is highly sensitive to the atmosphere in the diffusion furnace, as a result of which the diffusion method is insufficiently stable as a production process. Furthermore the ratio between the high and low doping is dependent and therefore local doping cannot be adjusted to the optimum. To obtain good contact with the ~~metalisation~~ metalization placed on the highly doped regions, which ~~metalilisation~~ metalization is frequently applied by screen printing, a low surface resistance, and thus as high as possible [[a]] doping, is desired. For the regions located between the ~~metalisation~~ metalization an increase in yield is possible, for example in the case of n-p-type solar cells, by passivation of the surface with thermal  $\text{SiO}_2$  or PECVD  $\text{SiN}$ , as a result of which recombination of charge carriers at the surface is counteracted. This increase in yield can be achieved only if the doping is low.--

Page 2, between lines 3 and 4, insert the following heading:

--SUMMARY OF THE INVENTION--

Page 2, replace the paragraph beginning on line 10 with the following amended paragraph:

--To this end the method according to the invention is ~~characterised~~ characterized in that before the diffusion step a diffusion barrier material is applied to the substrate at the location of the regions of low doping by imprinting with the barrier material in the pattern of the regions of low doping.--

Page 2, replace the paragraph beginning on line 14 with the following amended paragraph:

--During the diffusion step, which usually will be carried out at temperatures of approximately 900°C, the substrate regions located beneath the barrier material are shielded by the latter from the diffusion material applied to the ~~neighbouring~~ neighboring regions. As a result the concentration in the regions of low doping can be freely adjusted accurately and independently of the concentration in the highly doped regions. Furthermore, with the method according to the invention a single screen printing step and a single drying step can suffice.--

Page 2, replace the paragraph beginning on line 8 as follows:

--Alternatively, according to the invention the barrier material is first applied by screen printing, stencil printing, offset printing or tampon printing or using other printing techniques known per se to those regions of the substrate which are to have low doping. The doping material can then be applied as a single layer by spraying, spinning, immersing, ~~vapour~~ vapor deposition or from the gas phase (such as, for example, by means of  $\text{POCl}_3$  gas in a crystal tube) on top of the substrate and on top of the barrier material.--

Page 3, between lines 14 and 15, insert the following heading:

--BRIEF DESCRIPTION OF THE DRAWINGS--

Page 3, between lines 16 and 17, insert the following heading:

--DESCRIPTION OF THE PREFERRED EMBODIMENTS--

Page 4, replace the paragraph beginning on line 1 with the following amended paragraph:

--Fig. 2a shows a first step of the method according to the invention, in which a barrier material 5, 5', 5" is applied by means of a printing technique, such as, for example, screen printing, to the p-type crystalline silicon substrate 1 above those regions of the substrate 1 which are to have low doping.

The barrier material 5-5" comprises, for example, a dielectric material such as  $\text{Si}_3\text{N}_4$ ,  $\text{SiO}_2$  or  $\text{TiO}_2$  in paste form. After imprinting the paste the barrier material 5-5" is sintered at a temperature between  $200^\circ\text{C}$  and  $1000^\circ\text{C}$ . The doping material 2 is then applied uniformly over the substrate 1 and over the barrier material 5-5", as shown in Fig. 2b. The doping material can be applied in very many different ways, for example in the form of an organic molecule (for example triethyl phosphate) or in the form of phosphoric acid. The doping material 2 can be applied by means of spraying, spinning, immersion, ~~vapour~~ vapor deposition or from a gas phase.--

Page 4, replace the paragraph beginning on line 12 with the following amended paragraph:

--The semiconductor device according to Fig. 2b is then placed in a diffusion furnace and subjected to a diffusion step at, for example, approximately  $1000^\circ\text{C}$ . As a result of this the n-type atoms diffuse from the doping material 2 into the substrate 1, so that highly doped regions 6, 6', which are located between regions 7, 7', 7" of low doping, are formed in the substrate 1. The regions 7, 7', 7" of low doping are located beneath the barrier material 5-5". Finally, conducting ~~contracts~~ contacts 8, 8', for example consisting of ~~aluminium~~ aluminum, are applied, likewise by means of a printing technique, to the doping material 2 on top of the highly doped regions 6, 6'. However, it

is also possible to etch away the doping material 2 and the barrier material 5-5" after the diffusion step in Fig. 2b and then to apply a passivating layer consisting of, for example, SiO<sub>2</sub> or PECVD SiN over the substrate 1.--

Page 5, replace the paragraph beginning on line 6 with the following amended paragraph:

--This method has the advantage that an optical difference which can be used when aligning the ~~metalisation~~ metalization pattern is produced between the positions of the barrier material and ~~neighbouring~~ neighboring locations. Furthermore, reduced reflection can be obtained with the construction according to Fig. 4c.--